SPARQL queries over Open Land Use, Open Transport Net and Smart Points Of Interest datasets

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Presentation content

1. Datasets introduction
2. Datasets integration
3. Conclusions
Open Land Use

- Seamless coverage of the most of Europe (around 42 millions objects)

- Re-use of INSPIRE (2007/2/EC) principles
  - Data model based on INSPIRE Existing Land Use object data model (Annex III Land Use Spatial data theme)
  - Reliable local sources of data are used which have certain quality, certain update period, persistent identifier where possible
  - Detailed object-based metadata
Open Land Use
Open Land Use

http://sdi4apps.eu/open_land_use/

SHP

Vector data download
Download data by countries in .shp format.

SDI4Apps

SDI4Apps PROJECT
S4A is an EU-funded project coordinated by the University of West Bohemia (Pilzen, CZ). It seeks to build a cloud-based framework with open APIs for data integration focusing on the development of 6 pilot applications.

SPARQL ENDPOINT

<table>
<thead>
<tr>
<th>o</th>
<th>p</th>
<th>s</th>
</tr>
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<tbody>
<tr>
<td><a href="http://sdi4apps.eu/open_land_use/rid10264769">http://sdi4apps.eu/open_land_use/rid10264769</a></td>
<td><a href="http://inspire.ec.europa.eu/schemas/4.0/boundingBox">http://inspire.ec.europa.eu/schemas/4.0/boundingBox</a></td>
<td>&quot;2017-03-03&quot;</td>
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<td>&quot;2017-03-03&quot;</td>
</tr>
</tbody>
</table>
Open Transport Map

http://opentransportmap.info/

Open Transport Map = INSPIRE compatible and routable OpenStreetMap

The Open Transport Map allows routing and dynamic visualization of traffic volumes. It also offers many other ways of innovative exploitation. The underlying data are accessible in an open INSPIRE compatible format.

Visualization

Layer manager

Filter:

Baselayers
Topographic map

Map Content
OpenTransportMap

Search:
Open Transport Map

- Seamless coverage of Europe (around 85 millions of roadlinks)
- Re-use of INSPIRE (2007/2/EC) principles
  - Data model based on INSPIRE Road Transport Networks object data model (Annex I Transport Networks Spatial data theme)
  - OpenStreetMap used as a primary source of information, machinery monitoring
  - Routable
Open Transport Map

http://opentransportmap.info/

How can I use it?

AS DATA
- Download OTM here –

AS A MAP
- Embed OTM to your own website –
- Use OTM as a map layer in your own map (WMS) –

AS A SERVICE
- USE OTM as data in your own GIS (WFS) –
- SPARQL endpoint of OTM demo in a RDF – (sample queries)

SHP

GML
RDF
Open Transport Map

<rdf:Description rdf:about="http://opentransportmap.info/rdf/Volume16618393">
<otm:roadlink rdf:resource="http://opentransportmap.info/rdf/11836027"/>
<otm:trafficvolume>5</otm:trafficvolume>
<otm:column>333</otm:column>
<otm:fromtime>2016-04-04 00:00:00</otm:fromtime>
<otm:totime>2016-04-04 01:00:00</otm:totime>
</rdf:Description>
Smart Points of Interest

- Seamless and open Points of Interest database
- Around 27 million objects
- Global coverage
Smart Points of Interest

http://sdi4apps.eu/spoi

Over 27,000,000 Points of Interest in the data set

Open and seamless SPOI data set, which is based on Linked data principles, contains over 27 million Points of Interest important for tourism from around the world.

What is SPOI data set?

The Smart Points of Interest data set is the seamless and open resource of POIs that is available for other users to download, search or reuse in applications and services.

Its principal target is to provide information as Linked data together with other data set containing road network.

The added value of the Smart approach in comparison to other similar solutions consists in implementation of Linked data, using of standardized and respected datatype properties and development of the completely harmonized data set with uniform data model and common classification.

Why use SPOI data set?

- OPEN AND SEAMLESS DATABASE
  The SDI4Apps team developed a seamless open database of POIs, which will be distributed as 5-star Linked Open Data to be accessible for all users.

- OPEN AND FLEXIBLE DATA MODEL
  The essential core of the model was extended by several attributes which are integral components of some original data and could be helpful for tourist purposes.

- COMBINATION OF GLOBAL AND LOCAL DATA
  The SPOI data set is created as a combination of global data (extracted points from OpenStreetMap) and local data provided by the SDI4Apps partners or data available on the web.
Smart Points of Interest

OWL ontology

SPARQL endpoint
OLU/OTM/SPOI RDF Integration

1. Massive data transformation into RDF
2. Loading datasets in Virtuoso
3. Query building
4. Data visualization
Used software:
- D2RQ for transforming Relational Databases as Virtual RDF Graphs
- RDF for the representation of data
- Ontologies providing the underlying vocabulary and relations
- Virtuoso for storing the semantic datasets
- Sparql for querying semantic data
- Silk for discovery of links
- Hslayers NG for visualisation of data
- Metaphactory for visualisation of data

OLU/OTM/SPOI RDF Integration
## Linked OLU/OTM/SPOI

<table>
<thead>
<tr>
<th>Dataset Name</th>
<th>Graph in FOODIE endpoint</th>
<th>Source</th>
<th>Triples</th>
</tr>
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<tbody>
<tr>
<td>OLU**</td>
<td><a href="http://w3id.org/foodie/olu#">http://w3id.org/foodie/olu#</a></td>
<td>Transformed from PostgreSQL</td>
<td>127,925,971</td>
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<tr>
<td>SPOI</td>
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<td>Source provided by WRLS, modified and fixed before loading</td>
<td>381,393,555</td>
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<tr>
<td>Urban Atlas*</td>
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<td>CTIC</td>
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</tr>
</tbody>
</table>
### OLU/OTM/SPOI Interfaces

- **Sparql endpoint:** [https://www.foodies-cloud.org/sparql](https://www.foodies-cloud.org/sparql)

#### Virtuoso SPARQL Query Editor

```
PREFIX geo: <http://www.opengis.net/ont/geosparql#>
PREFIX geojson: <http://www.opengis.net/ont/geojson#>
PREFIX virl: <http://www.openlinksw.com/schema/virl#>
PREFIX vgrads: <http://www.openevo.eu/vgrads#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX ol: <http://w3id.org/foodies/olu#>

SELECT DISTINCT oluThematicResource ?municode ?specificLandUse FROM <http://w3id.org/foodies/olu#>
WHERE {
  ?olu a oluLandUse .
  ?olu geo:hasGeometry ?geometry .
  OPTIONAL (?olu oluThematicSource ?geoSource) .
  OPTIONAL (?olu oluSpecificLandUse ?specificLandUse) .
  ?geometry geo:asWKT ?coordinateSystem .
}
```

#### Results

<table>
<thead>
<tr>
<th>olu</th>
<th>hildes</th>
<th>source</th>
<th>municode</th>
<th>specificLandUse</th>
</tr>
</thead>
</table>
OLU/OTM/SPOI interfaces


Displaying Ranked Entity Names and Text summaries where:

7,51 has any Attribute with Value "poznan" Drop.

View query as SPARQL  Facet permalink
Map visualization

Map visualisation:
http://ng.hslayers.org/examples/olu_spoi/?hs_panel=info&hs_x=160779
9.902082933&hs_y=6462976.717926565&hs_z=16&visible_layers=Base%20layer;Land%20use%20parcels
Map visualization

- Map visualisation:
  [http://ng.hslayers.org/examples/olu_spoi/?hs_panel=info&hs_x=1607799.902082933&hs_y=6462976.717926565&hs_z=16&visible_layers=Base%20layer;Land%20use%20parcels](http://ng.hslayers.org/examples/olu_spoi/?hs_panel=info&hs_x=1607799.902082933&hs_y=6462976.717926565&hs_z=16&visible_layers=Base%20layer;Land%20use%20parcels)
Conclusions

- Conversion of 3 big datasets into RDF
- Opportunity to use spatial relationships between these three datasets
- Promote publishing of RDF data by other institutions
- Kept connection to other objects that have stable URIs
- As datasets cover many various phenomenas – opportunity to implement multi-criterias functionality for the area evaluation
- Possibility to convert free text sentences into triples and easy form SPARQL query, so eventually search on the map can be free text typing
Thank you!

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